REPORT OF

GEOTECHNICAL INVESTIGATION

PROPOSED MIX-USE BUILDING PROJECT

LOT LT B; ARB.1 AND LOT LT B; ARB. 2 OF TRACT NO. 6826

800-840 SOUTH FAIRFAX AVENUE

LOS ANGELES, CALIFORNIA 90036

FOR

830 FAIRFAX OWNER II, LLC

PROJECT NO. 19-402-02

AUGUST 28, 2019

August 28, 2019 19-402-02

830 Fairfax Owner II, LLC
3960 Howard Hughes Parkway
Suite 150
Las Vegas, Nevada 89169

Attention: Mr. Chris Clifford

Subject: Report Of Geotechnical Investigation
Proposed Mix-Use Building Project
Lot LT B; Arb. 1 And Lot LT B; Arb. 2 Of Tract No. 6826
800-840 South Fairfax Avenue
Los Angeles, California 90036

Gentlemen:

INTRODUCTION

This report presents the results of a geotechnical investigation for the subject project. During the course of this investigation, the engineering properties of the subsurface materials were evaluated in order to provide recommendations for design and construction of temporary excavations, foundations, grade slabs, and subsurface walls. The investigation included subsurface exploration, soil sampling, laboratory testing, engineering evaluation and analysis, consultation and preparation of this report.

During the course of preparation of this report, the submitted project plans were used as reference. The plans were prepared by the offices of Reed Architectural Design.

The enclosed Site Plan; Drawing No. 1, shows the approximate location of the drilled borings in relation to the site boundaries. This drawing also shows the approximate locations of the Cross Sections A-A' and B-B'. Drawing No. 2 and 3 show the profiles of the Cross Sections A-A' and B-B'.

Figure No. 1 shows the Site Vicinity Map. Figure No. 2 shows the Regional Topographic Map. Figure No. 3 shows the Regional Geologic Map. Figure No. 4 shows the Historaclly Highest Groundwater Contour Map.

The attached Appendix I, describes the method of field exploration. Figure Nos. I-1 through I-5 present summaries of the materials encountered at the location of our borings. Figure No. I-6 presents the Uniform Soil Classification System Chart; a guide to the Log of Exploratory Borings.

The attached Appendix II describes the laboratory testing procedures. Figure Nos. II-1 and II-2 present the results of direct shear and consolidation tests performed on selected undisturbed soil samples.

It should be noted that the presented recommendations for excavation and foundation are based on our understanding of the depth of cuts setback conditions, and assumed structural loading. This office should be consulted, if the actual structural loading and excavation depths are different from those used during this investigation.

PROJECT CONSIDERATIONS

It is our understanding that the proposed project will consist of construction of a mix-use building at the subject site. The proposed building is expected to be a 7-story structure constructed over one level of basement garage. The basement grade is expected to be established at some 6 to 12 feet below grade. Therefore, total height of excavation to the perimeter wall footing levels are expected to be on the order of 8 to 14 feet.

The basement level and lower 2 floors of the proposed building will be used for parking and commercial use. The upper 5 floors of the proposed building will be used for residential units. The upper 5 floors will be made of wood frame. The lower floors, including the basement, will be made of steel and concrete.

It is anticipated that the perimeter walls of the basement garage of the proposed building will be extended to close proximity north, east and west property lines. Therefore, during the course of basement garage construction, temporary shoring will be required. Such shoring system shall be in a form of cantilevered soldier piles. Where adequate horizontal space (a distance equal to the vertical height of excavation) beyond the planned line of excavation is available, unsupported, open excavation slopes with gradients as recommended in this report may be used.

Structural loading data was not available at the time of this investigation. For the purpose of this report, it is assumed that maximum concentrated loads of the interior columns will be on the order of 800 kips, combined dead plus frequently applied live loads. Perimeter and interior wall footings of the structure are expected to exert loads of on the order of 16 kips per lineal foot.

ANTICIPATED SITE GRADING WORK

Site grading will involve conducting the following tasks:

1. Excavation of the basement;
2. Subgrade preparation for support of basement grade slabs;
3. Wall backfilling within the over-excavated areas; and

The wall backfill material should be non-expansive and granular in nature. Therefore, only the excavated sandy soils can be used for wall backfilling.

It is anticipated that, after completion of the site grading work, materials will be exported from the site.

SITE CONDITIONS

SURFACE CONDITIONS

The site of the proposed project is located at 800-840 South Fairfax Avenue (SE Corner of Fairfax Avenue and 8th Street) Los Angeles, California. The site consists of two contiguous lots covering a plan area of about 45,450 square feet. See the enclosed Site Plan; Drawing No. 1 for site location.

At the time of our field investigation, the site was occupied by structures which will be removed from the site. The existing small commercial building within the southern portion will remain.

The ground surface was noted to be generally level. Existing off-site improvements occur around the subject site. These include buildings and public right-of-ways. See the enclosed Site Plan; Drawing No. 1 for detail.

SUBSURFACE CONDITIONS

Correlation of the subsoil between the borings was considered to be good. Generally, the site, to the depths explored, was found to be underlain by surficial fill underlain by natural deposits of silty sand, sandy silt, silty clay and sand-silt soils. Thickness of the existing fill was found to on the order of 2 feet in our borings. Deeper fill may be present between and beyond our borings, beneath the existing structures and in old utility lines. The existing fill is expected to be automatically removed by the planned basement garage excavations.

The upper native soils through which the basement garage excavations will be made, were found to consist of silty sand and sandy silt soils. The results of our laboratory investigation indicated that these materials were of moderate strengths.

The soils found near the planned foundation levels were found to be generally clean, silty sand, stiff, silty clay and sandy silt soils. The results of our laboratory testing indicated that these materials were of higher strengths and of low compression.

The clayey soils (found locally at the basement level and the sandy silt soils were found to be potentially expansive (having an expansion index ranging from 42 to 58).

GROUNDWATER

During the course of our investigation, no groundwater was encountered in our borings drilled to a maximum depths of about 31 feet. In accordance with the publish State Maps, however, the historically highest groundwater level in the vicinity of the subject site is reported to be close to 12 feet. See the enclosed Figure No. 4.

The basement grade of the proposed building will be established close to the historically highest water level. Although no water was found in our borings drilled to a maximum depth of 31 feet and groundwater is expected not to rise the historically highest level during the useful life of the proposed building, it is still recommended that, for added safety, the basement slabs for this project to be designed based on hydrostatic uplift pressure assuming water at a depth of 9 feet. The bottom of the basement slabs should also be properly waterproofed.

For the purpose of this project, pre-construction (temporary) and post construction (permanent) de-watering will not be required.

CANING CONSIDERATIONS

Due to the method of drilling (use of continuous auger) caving was not detected during the course of our field exploration. Because of significant fine content of the site soils extending below basement, forming will not be required during foundations construction. Lagging , however, will also require between the solider piles.

SEISMIC DESIGN CONSIDERATIONS

In accordance with ASCE-7-16, the project site can be classified as site "D". The mapped spectral accelerations of S_S=2.048 (short period) and S_1 =0.730 (1-second period) can be used for this project. These parameters corresponds to site Coefficients values of F_a =1.0 and F_V =1.5, respectively.

The seismic design parameters would be as follows:

Sms= Fa (Ss) = 1.0 (2.048) = 2.048 Sm1=Fv (S1) = Null - See Section 11.4.8

Sds=2/3 (Sms) = 2/3 (2.048) = 1.365, Sd1=2/3 (Sm1) = Null - See Section 11.4.8

LIQUEFACTION POTENTIAL

During the course of our investigation, no water was found in our borings extended to a maximum depth of about 31 feet. Although the historically highest groundwater level in the vicinity of the subject site is shown by the State maps to be near a depth of about 12 feet (see the enclosed Figure No. 4), the State of California Seismic Hazard Zone Maps have placed the subject site outside the designated zone of potential liquefaction. On this basis, it is our opinion that soil liquefaction will not occur at the subject site.

EVALUATION AND RECOMMENDATIONS

GENERAL

Based on the geotechnical engineering data derived from this study, the site is considered to be suitable for the proposed development. Conventional spread footing foundation system can be used for support of the proposed building. The foundation bearing materials are expected to be dense and stiff, native soils.

It is expected that the basement excavation would be made through surficial fill and native soils consisting of silty sand and sandy silt soils. Maximum height of excavation to the perimeter wall footing levels are expected to be about 14 feet.

During the course of basement garage construction, temporary shoring will be required. This will consist of cantilevered soldier piles. Where adequate horizontal space beyond the planned line of excavation is available, unsupported, open excavation slopes with gradients as recommended in this report may be used.

Near grade slabs, if proposed, should be supported on a compacted fill blanket, requiring that any surficial fill be removed and recompacted. The basement floor slabs can be supported on the exposed subgrade, provided that any disturbed soils would be scarified and compacted in-place to a relative compaction of at least 90 percent at some 3 percent above the optimum moisture content. Because the site upper soils are considered to be potentially expansive, it is recommended that the new near grade slabs for this project to have a minimum thickness of 5 inches and be reinforced with # 4 bars placed at every 18 inches on center.

The basement grade of the proposed building will be established close to the historically highest water level. Although no water was found in our borings drilled to a maximum depth of 31 feet and groundwater is expected not to rise the historically highest level during the useful life of the proposed building, it is still recommended that, for added safety, the basement slabs for this project to be at least 9 inches thick and be designed based on hydrostatic uplift pressure assuming water at a depth of 9 feet. The bottom of the basement slabs should also be properly waterproofed.

The following sections present our specific recommendations for temporary excavations, foundations, lateral design, basement grade slabs, subsurface walls, and observations during construction.

TEMPORARY EXCAVATION

Unshored Excavations: Where space limitations permit, unshored temporary excavation slopes could be used. Based upon the engineering characteristics of the site upper soils, it is our opinion that temporary excavation slopes in accordance with the following table should be used:

Maximum Depth of Cut (Ft)	Maximum Slope Ratio (Horizontal:Vertical)
0-4	1/2:1
>4	1:1

Water should not be allowed to flow over the top of the excavation in an uncontrolled manner. No surcharge should be allowed within a 45-degree line drawn from the bottom of the excavation. Excavation surfaces should be kept moist but not saturated to retard raveling and sloughing during construction.

It would be advantageous, particularly during wet season construction, to place polyethylene plastic sheeting over the slopes. This will reduce the chances of moisture changes within the soil banks and material wash into the excavation.

Cantilevered Soldier Piles: In the areas where adequate horizontal distance beyond the planned line of excavation is not available, cantilevered soldier piles should be used as a means of temporary shoring. Soldier piles consist of structural steel beams encased in slurry mix.

The lateral resistance for soldier piles may be assumed to be offered by passive pressure below the basement. An allowable passive pressure of 500 pounds per square foot per foot of depth may be used below the cut for piles having center-to-center spacing of 2-1/2 times the pile diameter. Maximum allowable passive pressure should be limited to 5,000 pounds per square foot. The maximum center-to-center spacing of the vertical shafts should be no greater than 10 feet.

For design of temporary support, active pressure on piles may be computed using an equivalent fluid density of 25 pounds per cubic foot. Uniform surcharge may be computed using an active pressure coefficient of 0.30 times the uniform load.

When using cantilevered soldier piles, the point of fixity may be assumed to occur at some 2 feet below the base of the excavation. In order to limit local sloughing, it is recommended that lagging be used between the soldier piles. All wood members left in ground should be pressure treated. For the purpose of design, lagging pressure should not exceed 400 pounds per square foot.

It should be noted that the recommendations presented in this section are for use in design and for cost estimating purposes prior to construction. The contractor is solely responsible for safety during construction.

TOLERABLE LATERAL MOVEMENTS

For the purpose of this project, where off-site buildings occur within a horizontal distance equal to the depth of excavation, the temporary shoring should be designed to allow lateral deflection of less than ½ of one inch at the tops of the piles. In the areas where the shoring system supports public right-of-way, the tolerable lateral movement at the tops of the shoring piles could be increased to one inch.

MONITORING

The temporary shoring piles should be monitored periodically during the course of basement garage construction to assure the lateral movements of the shoring piles are within the recommended tolerable limits. The project structural/shoring engineer should examine the site and assign appropriate surcharge loads for the off-site structures to be added to the lateral earth pressures. The results of the monitoring (lateral and vertical movements of the shoring piles) should be submitted to the project soil and shoring engineers for review and comments. If the results show excessive movements, additional lateral support should be provided.

It is also recommended that the conditions of the off-site improvements be recorded by pictures or video before installation of the shoring piles and basement garage excavation.

FOUNDATIONS

Conventional spread footing foundation systems could be used to support the proposed building. The foundation bearing materials are expected to be dense, relatively clean native sand soils.

Exterior and interior footings should be a minimum of 18 inches wide. Footings should be placed at a minimum depth of 24 inches below the lowest adjacent final grades (in this case, basement level).

The above given foundation dimensions are the recommended minimum values. The actual foundation dimension may be greater, depending upon the magnitudes of the vertical and lateral loading conditions.

The recommended allowable maximum bearing pressure for minimum size footings placed in native soils could be taken as 2,700 pounds per square foot.

This value may be increased at a rate of 120 and 240 pounds per square foot for each additional foot of footing width and depth, to a maximum value of 4,500 pounds per square foot. The given values are for the total of dead and frequently applied live loads. For short duration transient loading, such as wind or seismic forces, the given values may be increased by one-third.

Under the allowable maximum soil pressure, footings with assumed collected loads of 800 kips are expected to settle about one inch. Continuous footings, with loads of about 8 kips per linear foot are expected to settle on the order of 7/8 of one inch. Maximum differential settlements are expected to be on the order of 1/4 of an inch.

LATERAL DESIGN

Lateral resistance at the base of footings in contact with native soils may be assumed to be the product of the dead load forces and a coefficient of friction of 0.30. Passive pressure on the face of footings may also be used to resist lateral forces. A passive pressure of zero at the finished grades and increasing at a rate of 250 pounds per square foot per foot of depth to a maximum value of 2,700 pounds per square foot may be used for footings poured against native soils.

GRADE SLABS

Near grade slabs, if proposed, should be supported on a compacted fill blanket, requiring that any surficial fill be removed and recompacted. The basement floor slabs can be supported on the exposed subgrade, provided that any disturbed soils would be scarified and compacted in-place to a relative compaction of at least 90 percent at some 3 percent above the optimum moisture content. Because the site upper soils are considered to be potentially expansive, it is recommended that the new near grade slabs for this project to have a minimum thickness of 5 inches and be reinforced with #4 bars placed at every 18 inches on center.

The basement grade of the proposed building will be established close to the historically highest water level. Although no water was found in our borings drilled to a maximum depth of 31 feet and groundwater is expected not to rise the historically highest level during the useful life of the proposed building, it is still recommended that, for added safety, the basement slabs for this project to be at least 9 inches thick and be designed based on hydrostatic uplift pressure assuming water at a depth of 9 feet. The bottom of the basement slabs should also be properly waterproofed.

In the areas where moisture sensitive floor covering is used and slab dampness cannot be tolerated, a vapor-barrier should be used beneath the slabs. This normally consists of a 6-mil polyethylene film covered with 2 inches of clean sand.

BASEMENT WALLS

The perimeter walls of the basement are expected to be buried to a maximum depth of about 12 feet. Static design of these walls (being restrained against rotation) should be based on an equivalent fluid pressure of 72 pounds per square foot per foot of depth. Cantilevered retaining walls (ramp area) can be designed based on an equivalent fluid pressure of 30 pounds per square foot per foot of depth. See the enclosed supporting engineering calculations.

The above given pressures assume that no hydrostatic pressure will occur behind the retaining walls. This will require installation of proper subdrain behind the basement garage walls. Subdrain normally consists of 4-inch diameter perforated pipes encased in gravel (at least one cubic foot per lineal foot of the pipes). In order to reduce the chances of siltation and drain clogging, the free-draining gravel should be wrapped in filter fabric proper for the site soils.

In addition to the lateral earth pressure, the basement garage walls should also be designed for any applicable uniform surcharge loads imposed on the adjacent grounds. For cantilevered retaining walls, the uniform surcharge effects may be computed using a coefficient of 0.30 times the assumed uniform loads. For restrained walls, a coefficient of 0.45 times the assumed uniform loads should be used.

It is noted that, based on the new Code requirement, the basement walls should be designed not only for static, but also for seismic lateral earth pressures. For the purpose of this project, the magnitude of seismic lateral earth pressure should be assumed at a rate of 31 pounds per square foot per reducing depth from the bottom of excavation. The point of application of the lateral thrust of the seismic pressure should be assumed 0.6 time the wall height, measured from the bottom of the wall. If the total lateral earth pressure (static and seismic; assuming cantilevered condition) is less than "at-rest" pressure, then the actual design of the basement walls should be based on restrained condition.

Where adequate space is available, granular fill (silty sand soils) should be placed and compacted behind the retaining walls (after the subdrain is installed) to a relative compaction of at least 90 percent. At least one field density tests should be taken for each 2 feet of the backfill. The degree of compaction of the wall backfill should be verified by the Soil Engineer.

Where space is limited, free-draining gravel should be placed behind the retaining walls. The gravel should then be capped with at least 18 inch thick site soils also compacted to a relative compaction of at least 90 percent. It should be noted that the backfill placed behind the basement garage walls should be made after the concrete decking is cast. All grading surrounding the building should be such to ensure that water drains freely from the site and does not pond.

GRADING RECOMMENDATIONS

Site grading for the proposed project is expected to include excavation in order to create the basement garage grades and backfilling behind the basement walls. The excavated sandy soils should be used for wall backfilling.

Prior to placing any fill, the Soil Engineer should observe the bottoms. The areas to receive fill should be scarified to a depth of about 8 inches, moistened to bring to near optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined by the ASTM Designation D 1557 Compaction Method.

General guidelines regarding site grading are presented below which may be included in the earthwork specification. It is recommended that all fill be placed under engineering observation and in accordance with the following guidelines:

1. All fill should be granular in nature. Therefore, only the excavated sandy soil from the site may be reused in the areas of compacted fill.

2. Before wall backfilling, subdrain should be installed. The subdrain system should consist of 4-inch diameter perforated pipes embedded in about 1 cubic feet of free draining gravel per foot of pipe. An approved filter fabric should then be wrapped around the free draining gravel in order to reduce the chances of siltation. Non-perforated outlet pipes should then be used to pass through the wall into an interior sump. The subdrain pipes should be laid at a minimum grade of two percent for self cleaning.

3. The excavated sandy soils from the site are considered to be satisfactory to be reused in the areas of compacted fill and wall backfill provided that rocks larger than 6 inches in diameter are removed.

4. Fill material, approved by the Soil Engineer, should be placed in controlled layers. Each layer should be compacted to at least 90 percent of the maximum unit weight as determined by ASTM designation D 1557 for the material used.

5. The fill soils shall be placed in 8-inch loose layer. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer.

6. When moisture content of the fill is too low, water shall be added and thoroughly dispersed until the moisture content is near optimum. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading or other satisfactory methods until near optimum moisture condition is achieved.

7. Inspection and field density tests should be conducted by the Soil Engineer during grading work to assure that adequate compaction is attained. Where compaction of less than 90 percent is indicated, additional compactive effort should be made with adjustment of the moisture content or layer thickness, as necessary, until at least 90 percent compaction is obtained.

SITE DRAINAGE

Site drainage should be provided to divert roof and surface waters from the property through nonerodible drainage devices to the street. In no case should the surface waters be allowed to pond adjacent to building or behind the basement garage walls. A minimum slope of one and two percent are recommended for paved and unpaved areas, respectively.

The site drainage recommendations should also include the following:

1. Having positive slope away from the buildings, as recommended above;
2. Installation of roof drains, area drains and catch basins with appropriate connecting lines;
3. Managing landscape watering;
4. Regular maintenance of the drainage devices;
5. Installing waterproofing or damp proofing, whichever appropriate, beneath concrete grade slabs and behind the basement walls.
6. The owners should be familiar with the general maintenance guidelines of the City requirements.

ON-SITE INFILTRATION

We understand that, as part of the proposed development, the City requires that, where possible, an on-site storm water infiltration system be used. The system receives the storm water and discharges into the ground for the purpose of recharging of the depressed groundwater. For the proposed project having subterranean parking garage, a vertical drain system; “dry well” is normally used.

For the purpose of determining the rate of percolation of the subsurface materials below the basement, in-situ testing was conducted in our Boring No. 3. The approximate location of the boring within which the percolation test was conducted, with respect to the site boundaries, is shown on the enclosed Site Plan; Drawing No. 1.

The boring within which the percolation testing was conducted was drilled with a hollow stem drilling machine having a diameter of 8 inches. Before the percolation testing was initiated, a 3-inch diameter pipe surrounded by gravel was installed in the boring.

Since the base of the proposed building will be established at some 10 feet below grade, and in order to reduce the chances of weakening the subgrade materials within the influence zone of foundation pressure, the percolation was forced to occur below a depth of 20 feet (between depths of 20 to 30 feet). Solid pipe was then used within the top 20 feet of the percolation boring. The percolation well was pre-saturated overnight before the in-situ testing.

The percolation testing for this project were performed on July 17 2019, one day after drilling and pre-saturation. As can be seen from the log of borings contained in Appendix I, the native soils below a depth of about 10 feet, extending to the bottom of the hole, consists of sand-silt mixture. Generally, these layers are considered to be of low permeable character.

The results of our in-situ percolation testing indicated a very low to no percolation through the subsoil. Our close examination of the boring logs also confirm the low percolation rating because the natural water content of the recovered soil samples were close to saturation level. Therefore the subject site is considered to e a poor candidate for on-site infiltration. Therefore the storm water should be diverted to the areas of planters and any excess water, after going through normal filtration process should be diverted to the curb line.

OBSERVATION DURING CONSTRUCTION

The presented recommendations in this report assume that all foundations will be established in native soils. All footing excavations should be observed and approved by a representative of this office before reinforcing is placed.

Drilling of the soldier piles should be made under continuous observation of Deputy Grading Inspector representing this office. It is essential to assure that all shoring piles are drilled to proper depths and diameters.

Site grading work, such as wall backfilling, and subgrade preparation for basement slab support, should be conducted under observation and testing by a representative of this firm. All backfill soils should be properly compacted to at least 90 percent relative compaction. For proper scheduling, please notify this office at least 24 hours before any observation work is required.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either express or implied.

It is noted that the conclusions and recommendations presented are based on exploration "window" borings and excavations which is in conformance with accepted engineering practice. Some variations of subsurface conditions are common between "windows" and major variations are possible.

-o0o-

The following Figures and Appendices are attached and complete this report:

Engineering Analysis - Lateral Earth Pressure
Drawing No. 1 - Site Plan
Drawing Nos. 2 And 3 - Cross Sections A-A' And B-B'
Figure No. 1 - Site Vicinity Map
Figure No. 2 - Regional Topographic Map
Figure No. 3 - Regional Geologic Map
Figure No. 4 - Historaclly Highest Groundwater Contour Map
Appendix I- Method of Field Exploration
Figure Nos. I-1 through I-6
Appendix II- Methods of Laboratory Testing
Figure Nos. II-1 and II-2

Respectfully Submitted,

APPLIED EARTH SCIENCES

Caro J. Minas, President,
Geotechnical Engineer,
GE 601

CJM/se

Distribution: (4) Addressee

Average Soil Strength Parameters

Saturated Unit Weight = γs = 126 pcf

Value of Fiction Angle = ϕ = 25.5 ^{o}

$$K_o = 1 - \sin(\phi)$$

$$K_o = 1 - \sin 26^{o}$$

$$K_o = 1 - 0.43$$

$$K_o = 0.57$$

$$\gamma_o = K_o * \gamma$$

$$\gamma_o = 0.57 * 126$$

$$\gamma_o = 71.8$$

At-Rest Equivalent Fluid Density, $\boxed{\gamma_o = 72 \text{ PCF}}$

AT-REST LATERAL EARTH PRESSURE

Basement Walls

FOR: 800-840 S. Fairfax Ave.	**DATE:** 8/27/19	**PROJECT NO.:** 19-402-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		**CALC SHEET No. 1**

Average Soil Strength Parameters

* FIGURE 2 of Naval Facilities Engineering Command

Saturated Unit Weight	ϒ=	126	PCF
Height of Wall	H=	13	Ft.
	PGA_M=	0.965	

$$P_{AE} = \frac{3}{8}\gamma H^2(K_h)$$ *7.2-78

$$K_h = \frac{\frac{2}{3} * PGA_M}{2}$$

K_h= 2/3 * 0.965 / 2

K_h= 0.32

P_{AE} = 3/8 * 126 * 169 * 0.32

P_{AE} = 2569 lb.

Equivelent Fliud Pressure (EFP)

$$EFP = (\frac{2xP_{AE}}{H^2})$$

EFP= 2 * 2569 / 169

EFP= **30.40 PCF**

SEISMIC LATERAL EARTH PRESSURE

Retaining Walls

FOR: 800-840 S. Fairfax Ave.	**DATE:** 8/27/19	**PROJECT NO.:** 19-402-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		**CALC SHEET NO. 2**

Average Soil Strength Parameters

Saturated Unit Weight γ = 126 pcf

C = 370 psf

ϕ = 25.5 °

Height of Wall

H= 13 ft

Weight of Surcharge Load on Wedge

W_q= 0.3 K

					Driving Force	Resisting Force	
SECTION	A (sf)	W (K)	L (feet)	α (degrees)	Wsinαcosα (k)	$W\cos^2\alpha\tan\phi$ (k)	CLcosα (k)
I	53.3	6.7	15.37	57.75	3.2	1.0	3.0
					3.2	4.0	

F.S. = ∑ RF / ∑ DF = 3.99 / 3.17 = 1.26

FOR FACTOR OF SAFETY = 1.25 (TEMPORARY)

1.25 (DF) = (RF) + UBF

1.25 * 3.17 = 3.99 + UBF

UBF = 3.96 - 3.99 = -0.03 k/lft.

Equivalent Fluid Density $G_h = 2P/H^2$

G_h = -0.3 pcf

Therefore use Recommended value of 25 pcf

FOR FACTOR OF SAFETY = 1.5 (PERMANENT)

1.5 (DF) = (RF) + UBF

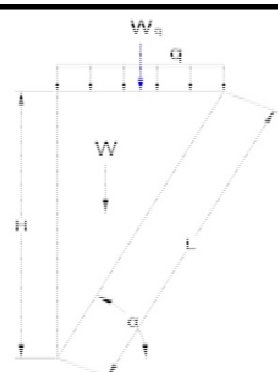
1.5 * 3.17 = 3.99 + UBF

UBF = 4.75 - 3.99 = 0.76 k/lft.

Equivalent Fluid Density $G_h = 2P/H^2$

G_h = 9.0 pcf

Therefore use Recommended value of 30 pcf

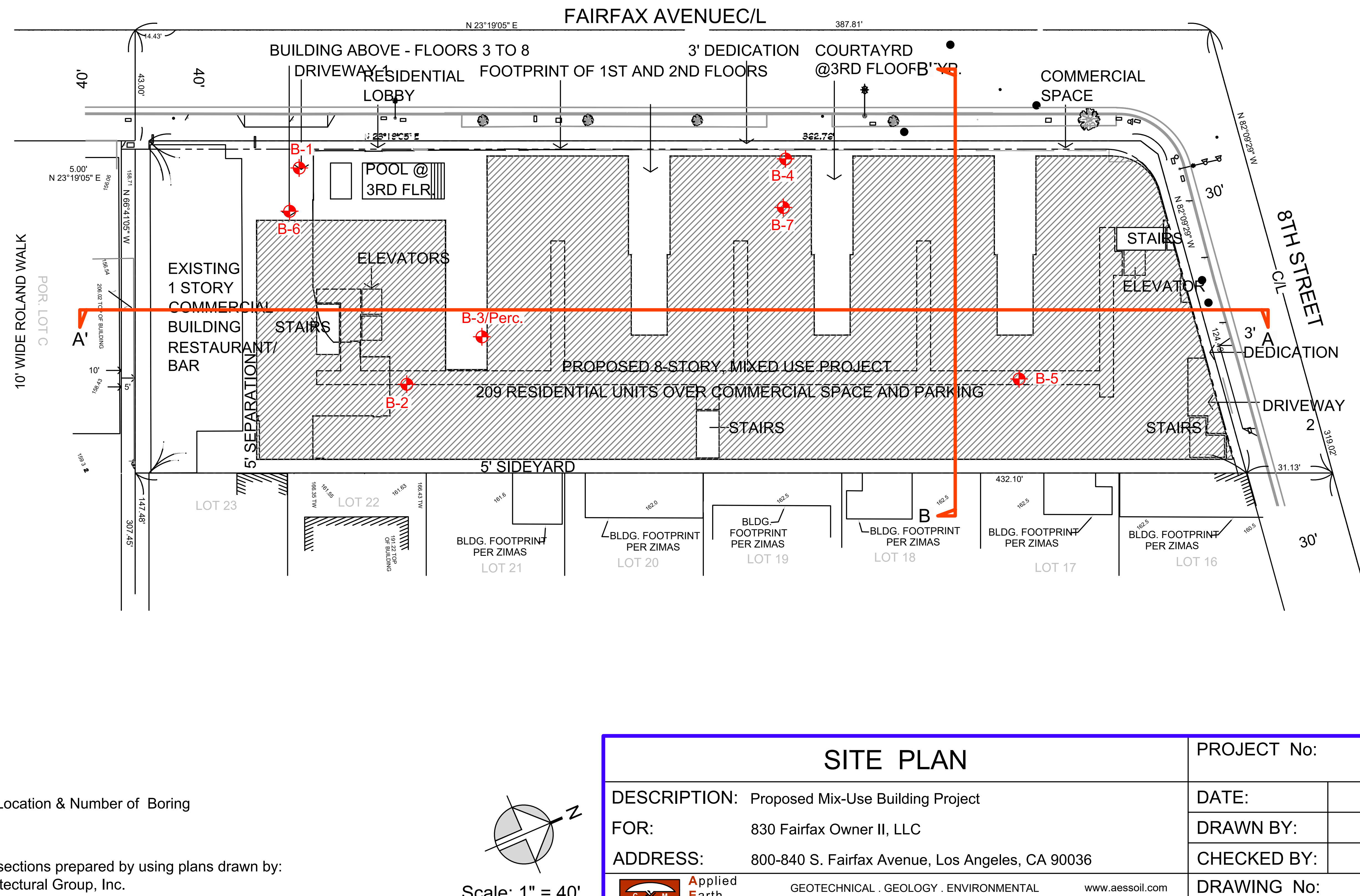


LATERAL EARTH PRESSURE CALCULATIONS

CANTILEVERED SYSTEM

SECTION A-A' - North Facing Basement Walls

FOR: 800-840 S. Fairfax Ave.	**DATE:** 8/27/19	**PROJECT NO.:** 19-402-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		**TABLE No. 1**

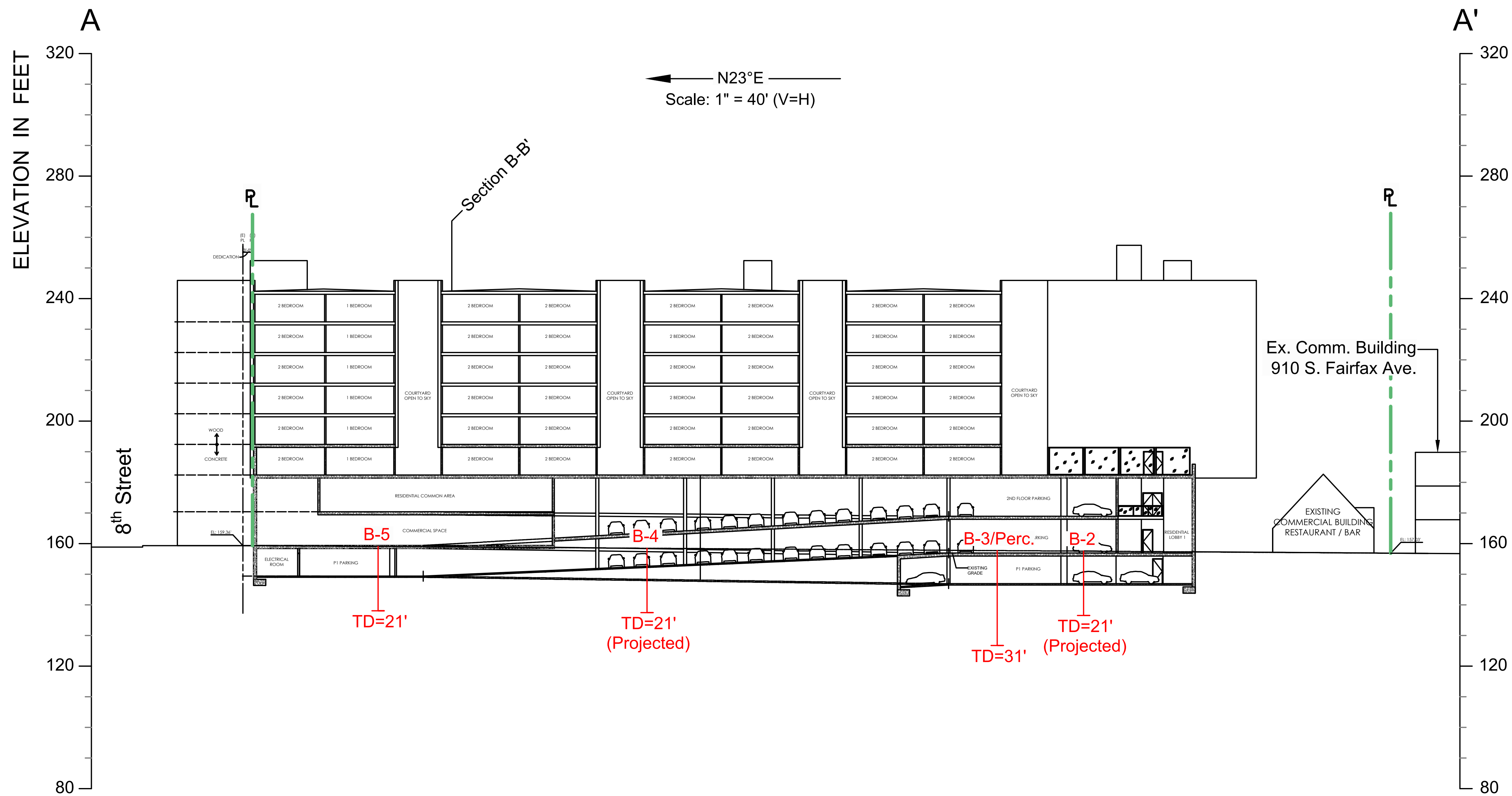


B-7 = Location & Number of Boring

Note:

Site plan & sections prepared by using plans drawn by:
-Reed Architectural Group, Inc.

SITE PLAN		PROJECT No: 19-402-02	
DESCRIPTION:	Proposed Mix-Use Building Project	DATE:	08 / 28 / 2019
FOR:	830 Fairfax Owner II, LLC	DRAWN BY:	VM
ADDRESS:	800-840 S. Fairfax Avenue, Los Angeles, CA 90036	CHECKED BY:	CM
Applied Earth Sciences	GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS www.aessoil.com (818) 552-6000	DRAWING No:	1



B-2

TD=10'
(Projected)

= Location & Number of Boring

CROSS SECTION A-A'

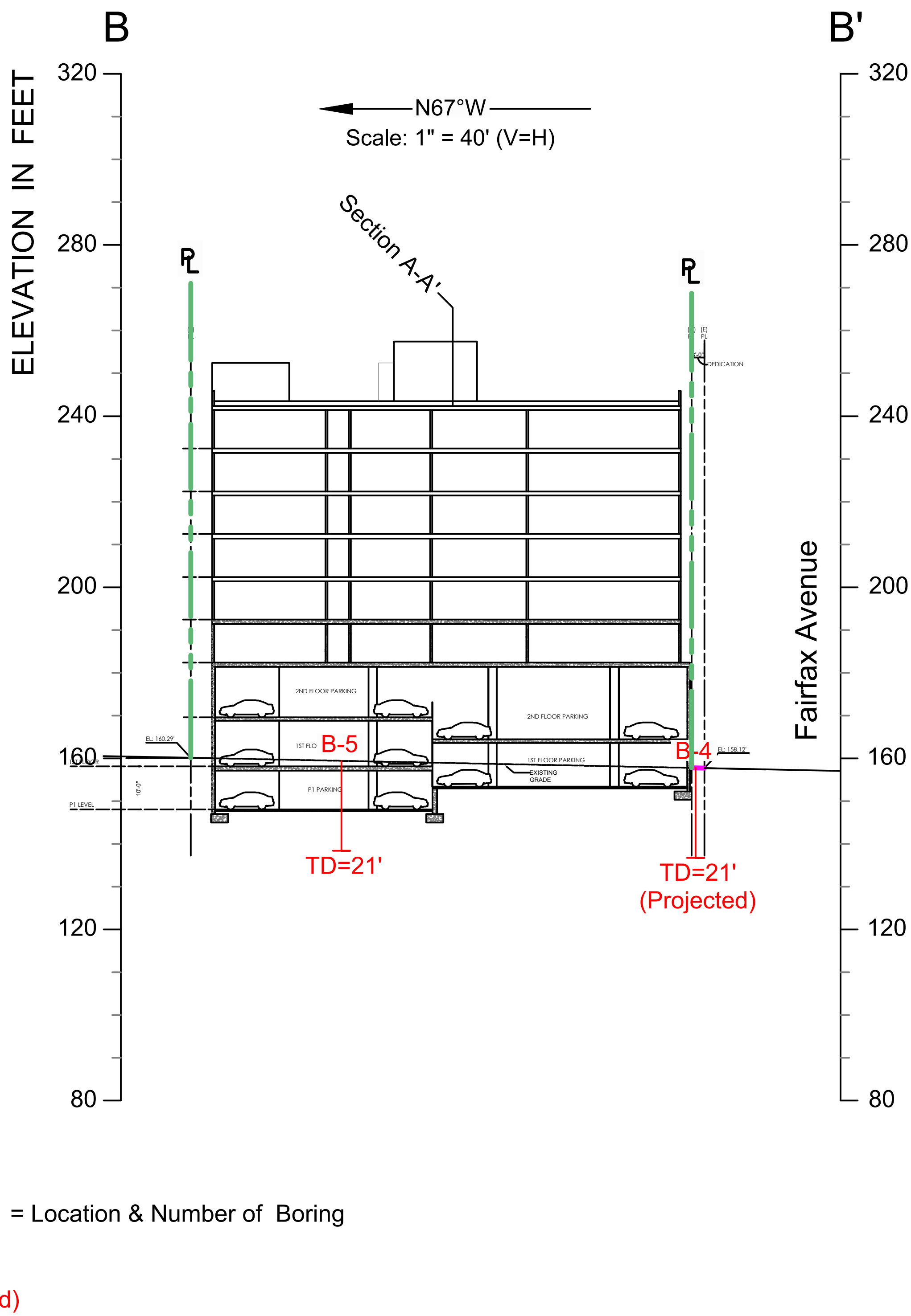
DESCRIPTION: Proposed Mix-Use Building Project

FOR: 830 Fairfax Owner II, LLC

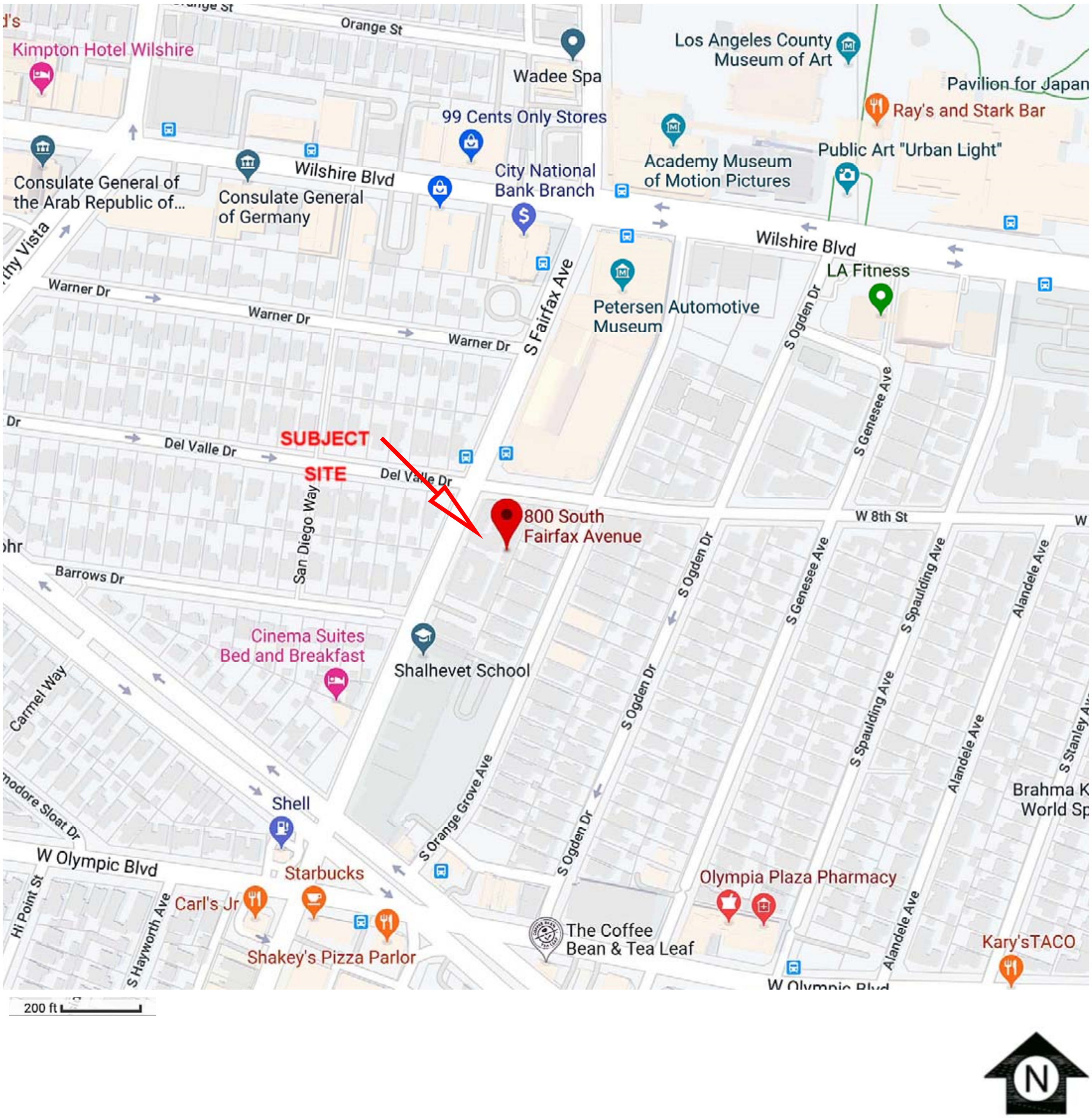
ADDRESS: 800-840 S. Fairfax Avenue, Los Angeles, CA 90036

PROJECT No:	19-402-02
DATE:	08 / 28 / 2019
DRAWN BY:	VM
CHECKED BY:	CM
DRAWING No:	2

Applied Earth Sciences
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS
www.aessoil.com
(818) 552-6000



CROSS SECTION B-B'		PROJECT No: 19-402-02	
DESCRIPTION:	Proposed Mix-Use Building Project	DATE:	08 / 28 / 2019
FOR:	830 Fairfax Owner II, LLC	DRAWN BY:	VM
ADDRESS:	800-840 S. Fairfax Avenue, Los Angeles, CA 90036	CHECKED BY:	CM
Applied Earth Sciences	GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS — www.aessoil.com (818) 552-6000	DRAWING No:	3



Reference: Portion of Google Maps

SITE VICINITY MAP

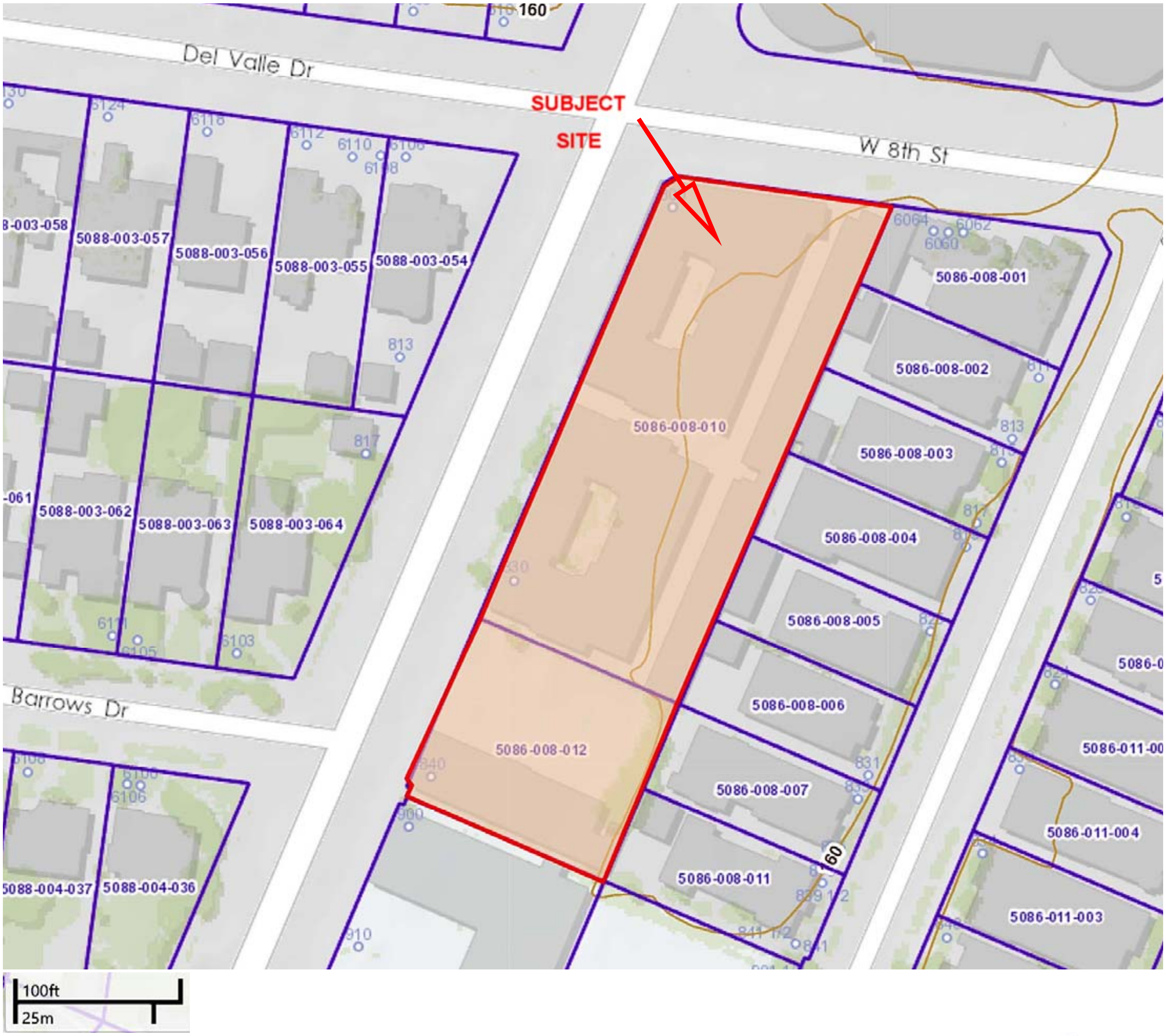
Proposed Mix Use Building Project

800-840 S. Fairfax Avenue, Los Angeles, CA 90036

FOR	DATE	PROJECT No.
830 Fairfax Owner II, LLC	08 / 28 / 2019	19-402-02

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

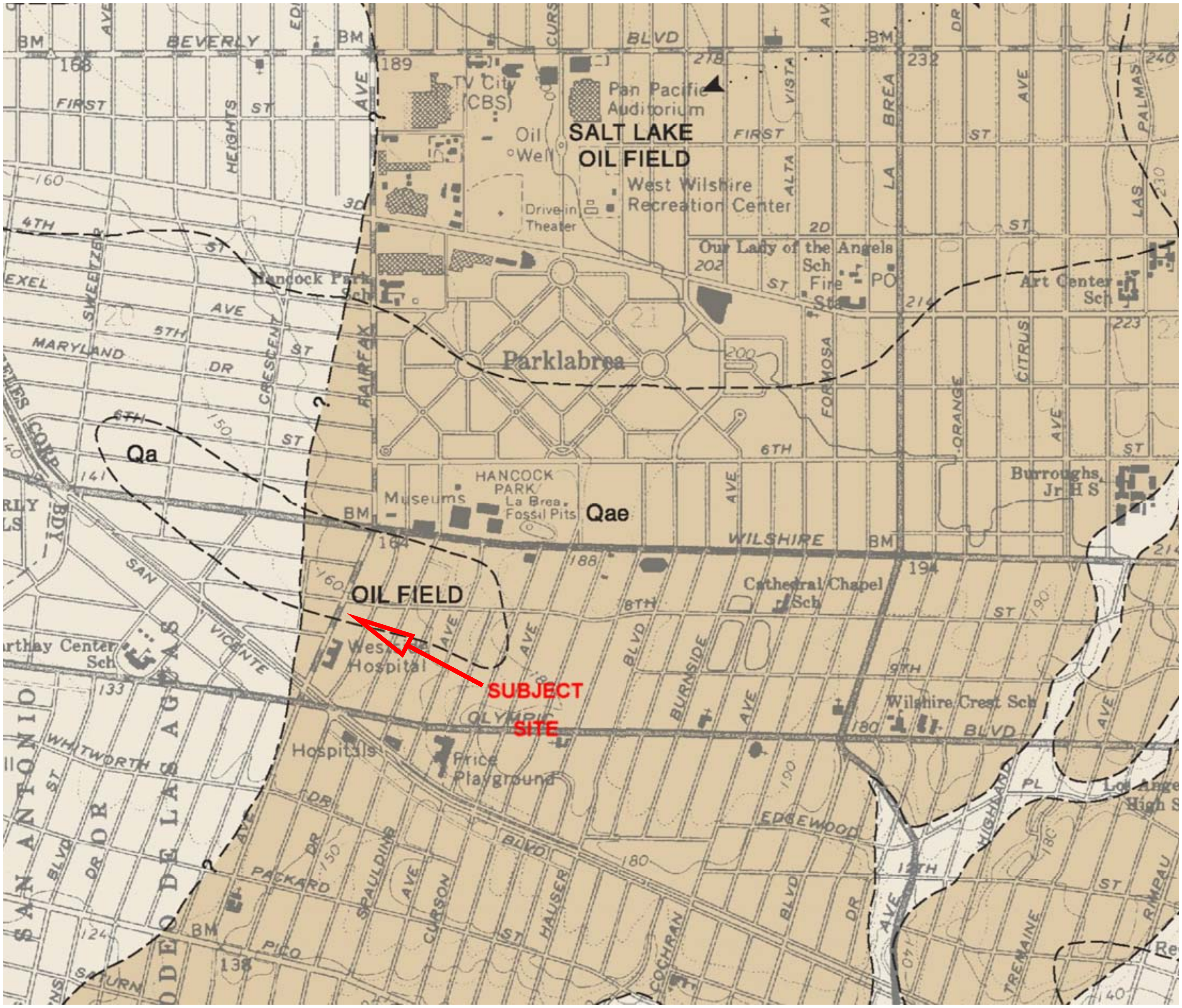
FIGURE No. 1



Reference: Los Angeles County GIS Map

REGIONAL TOPOGRAPHIC MAP

Proposed Mix Use Building Project 800-840 S. Fairfax Avenue, Los Angeles, CA 90036		
FOR 830 Fairfax Owner II, LLC	DATE 08 / 28 / 2019	PROJECT No. 19-402-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		FIGURE No. 2



Qa *Alluvium: clay, sand and gravel; includes gravel and sand of minor stream channels*
Qae *Similar to* **Qa***, but slightly elevated and dissected: includes alluvial fan sediments*

N

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

Reference: Dibblee Geologic Map of the Hollywood Quadrangle

REGIONAL GEOLOGIC MAP

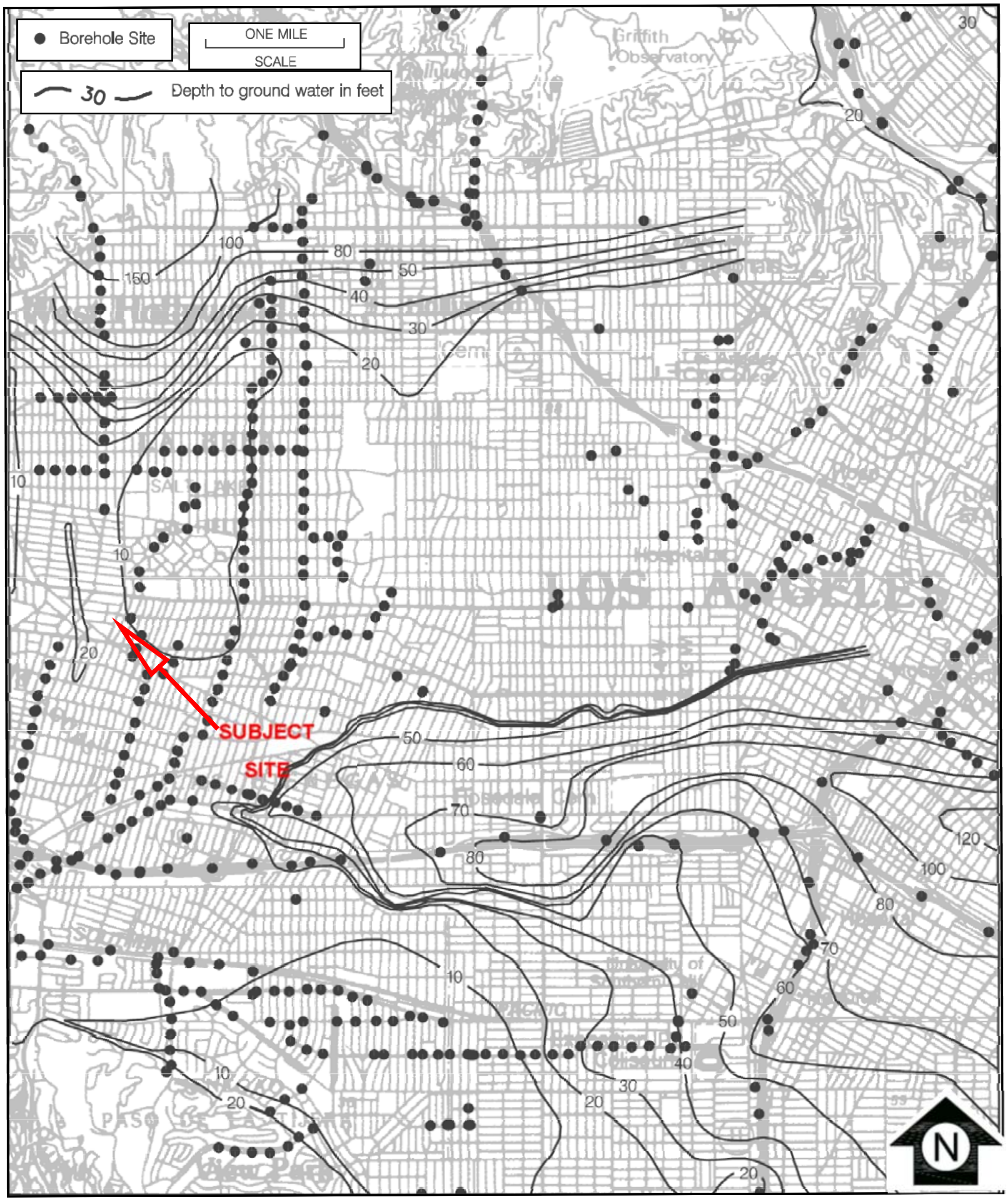
Proposed Mix Use Building Project

800-840 S. Fairfax Avenue, Los Angeles, CA 90036

FOR	DATE	PROJECT No.
830 Fairfax Owner II, LLC	08 / 28 / 2019	19-402-02

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. 3



Reference: Hollywood 7.5 Minute Quadrangle

HISTORICALLY HIGHEST GROUNDWATER (Contour Map)

Proposed Mix Use Building Project

800-840 S. Fairfax Avenue, Los Angeles, CA 90036

FOR	DATE	PROJECT No.
830 Fairfax Owner II, LLC	08 / 28 / 2019	19-402-02

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. 4

APPENDIX I
METHOD OF FIELD EXPLORATION

In order to define the subsurface conditions, five borings were drilled on the site. The approximate location of the drilled borings are shown on the enclosed Site Plan. The borings were drilled to a maximum depth of 31 feet with a hollow stem drilling machine.

Continuous logs of the subsurface conditions, as encountered in the test borings, were recorded during the field work and are presented on Figure Nos. I-1 through I-5 within this Appendix. These figures also show the number and approximate depths of each of the recovered soil samples.

Relatively undisturbed samples of the subsurface materials were obtained by driving a steel sampler with successive drops of a 140-pound standard sampling hammer free-falling a vertical distance of about 30 inches. The number of blows required for one foot of sampler penetration was recorded at the time of drilling and are shown on the log of exploratory borings. The relatively undisturbed soil samples were retained in brass liner rings 2.5 inches in diameter and 1.0 inch in height.

Field investigation for this project were performed on July 16, 2019. The materials excavated from the test borings were placed back and compacted upon completion of the field work. Such materials may settle. The owner should periodically inspect these areas and notify this office if the settlements create a hazard to person or property.

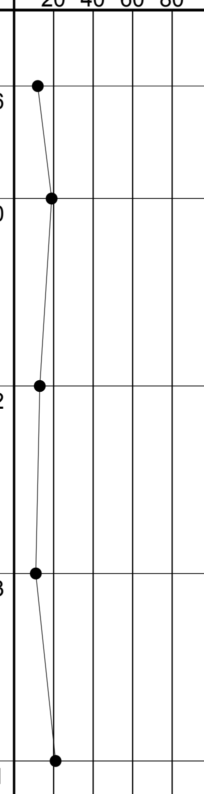
LOG OF BORING NO.1

19-402-02
800-840 S. Fairfax Ave., Los Angeles, CA 90036

AES
C.M. APPLIED EARTH SCIENCES

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: David. Ohanian
Location: * See Site Plan *

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ / % Moisture - ● (20 40 60 80)	% -200
0			(SM) FILL: Moderately compact, slightly moist, medium brown, slightly silty sand with gravel.						
2		■	(SM-ML) SAND: Dense, moist, light brown, fine sand-silt mixture.		26	12	126		
5		■	(ML-SM) SILT: Very stiff, moist, brown, silt-sand mixture.		35	19	110		
10		■	(SM-ML) SAND: Very dense, moist, grayish brown, sand- silt mixture.		48	13	122		
15		■	(SM) Grades to slightly silt more sandy.		46	11	123		
20		■	(ML) SILT: Very stiff, moist, brown, slightly sandy silt.		31	21	111		



End of Boring @ 21' FT
No Groundwater Encountered
Methane Probes Installed @ 5' 10' 20'.

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35

COMPLETION DEPTH: 21   DEPTH TO WATER> INITIAL:
DATE: July, 16 2019   FINAL:

I-1

LOG OF BORING NO.2

19-402-02
800-840 S. Fairfax Ave., Los Angeles, CA 90036

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: David. Ohanian
Location: * See Site Plan *

DEPTH, FT	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0	(SM) FILL: Moderately compact, slightly moist, medium brown, slightly silty sand with gravel.					
2	(SM-ML) SAND: Very dense, moist, light brown, fine sand-silt mixture.		34	16	118	
5	(SM-ML) Grades to medium brown.		32	15	113	
10	(ML-SM) SILT: Very stiff, moist, brown, trace of clay, silt-sand mixture.		41	18	115	
15	(ML) Grades to less sandy silt.		37	19	110	
20	(ML) Similar as above.		43	18	115	

% -200 - △
% Moisture - ●
20 40 60 80

End of Boring @ 21' FT
No Groundwater Encountered
Methane Probes Installed @ 5' 10' 20'.

COMPLETION DEPTH: 21   DEPTH TO WATER> INITIAL:
DATE: July, 16 2019   FINAL:

LOG OF BORING NO.3

19-402-02
800-840 S. Fairfax Ave., Los Angeles, CA 90036

AES
C.M. APPLIED EARTH SCIENCES

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: David. Ohanian
Location: * See Site Plan *

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, medium brown, slightly silty sand with gravel.						
2		■	(SP-SM) SAND: Dense, slightly moist, brown, fine to medium grained sand with gravel.		34	5	109		
5		■	(ML) SILT: Very stiff, moist, grayish brown, slightly clayey sandy silt.		36	18	117		
10		■	(CL) CLAY: Very stiff, moist, olive gray, slightly silty clay.		45	32	97		
15		■	(ML-SM) SILT: Very stiff, moist, olive gray, silt-sand mixture.		66	15	117		
20		■	(ML) Grades to greenish gray, slightly sandy		47	18	113		
25		■	(ML) SImilar as above.		37	18	116		
30		■	(ML-SM) Grades to hard, more sandy.		50	16	123		
35			End of Boring @ 31' FT No Groundwater Encountered Percolation Pipe Installed @ 30' Perforated Section from: 20-30.						

COMPLETION DEPTH: 31   DEPTH TO WATER> INITIAL:
DATE: July, 16 2019   FINAL:

LOG OF BORING NO.4

19-402-02
800-840 S. Fairfax Ave., Los Angeles, CA 90036

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: David. Ohanian
Location: * See Site Plan *

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, medium brown, slightly silty sand with gravel.						
		■	(SM-ML) SAND: Dense, moist, medium brown, fine grained sand-silt mixture.		23	16	113		
5		■	(ML) SILT: Stiff, moist, medium brown, slightly sandy silt.		22	21	107		
10		■	(SM-ML) SAND: Very Dense, moist, brown, fine grained sand-silt mixture.		41	16	111		
15		■	(ML-SM) SILT: Very stiff, moist, dark gray, slightly clay, silt-sand mixture.		44	19	115		
20		■	(ML) Grades to stiff.		30	21	106		
25			End of Boring @ 21' FT No Groundwater Encountered Methane Probes Installed @ 5' 10' 20'.						
30									
35									

COMPLETION DEPTH: 21   DEPTH TO WATER> INITIAL:
DATE: July, 16 2019   FINAL:

LOG OF BORING NO.5

19-402-02
800-840 S. Fairfax Ave., Los Angeles, CA 90036

Type: Hollow Stem Auger, With 140 Lb Hammer   Logged by: David. Ohanian
Location: * See Site Plan *

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, medium brown, slightly silty sand with gravel.						
2		■			14	15	116		
			(SM-ML) SAND: Medium dense, moist, medium brown, fine grained sand-silt mixture.						
5		■	(SM-ML) Grades to brown, dense.		22	17	112		
10		■	(SM-ML) SImilar as above.		33	16	117		
15		■	(SM-ML) SImilar as above		33	16	116		
20		■	(SM-ML) Grades to very dense.		40	17	110		
			End of Boring @ 21' FT No Groundwater Encountered Methane Probes Installed @ 5' 10' 20'.						
25									
30									
35									

COMPLETION DEPTH: 21   DEPTH TO WATER> INITIAL:
DATE: July, 16 2019   FINAL:

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAME
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Organic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Organic clay of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Organic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Organic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

NO. 200 NO. 40 NO. 10 NO. 4 ¾ in. 3 in. (12 in.)

U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

JOB NAME : Propose Multi-Family Residential Building Project
800-840 Fairfax Avenue,
Los Angeles, CA 90036

JOB No. 19-402-02

Applied Earth Sciences
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS
www.aessoil.com
(818) 552-6000

FIGURE No. I-6

APPENDIX II
LABORATORY TESTING PROCEDURES

Moisture Density

The moisture-density information provides a summary of soil consistency for each stratum and can also provide a correlation between soils found on this site and other nearby sites. The tests were performed using ASTM D 2216-04 Laboratory Determination of water content Test Method. The dry unit weight and field moisture content were determined for each undisturbed sample, and the results are shown on log of exploratory borings.

Shear Tests

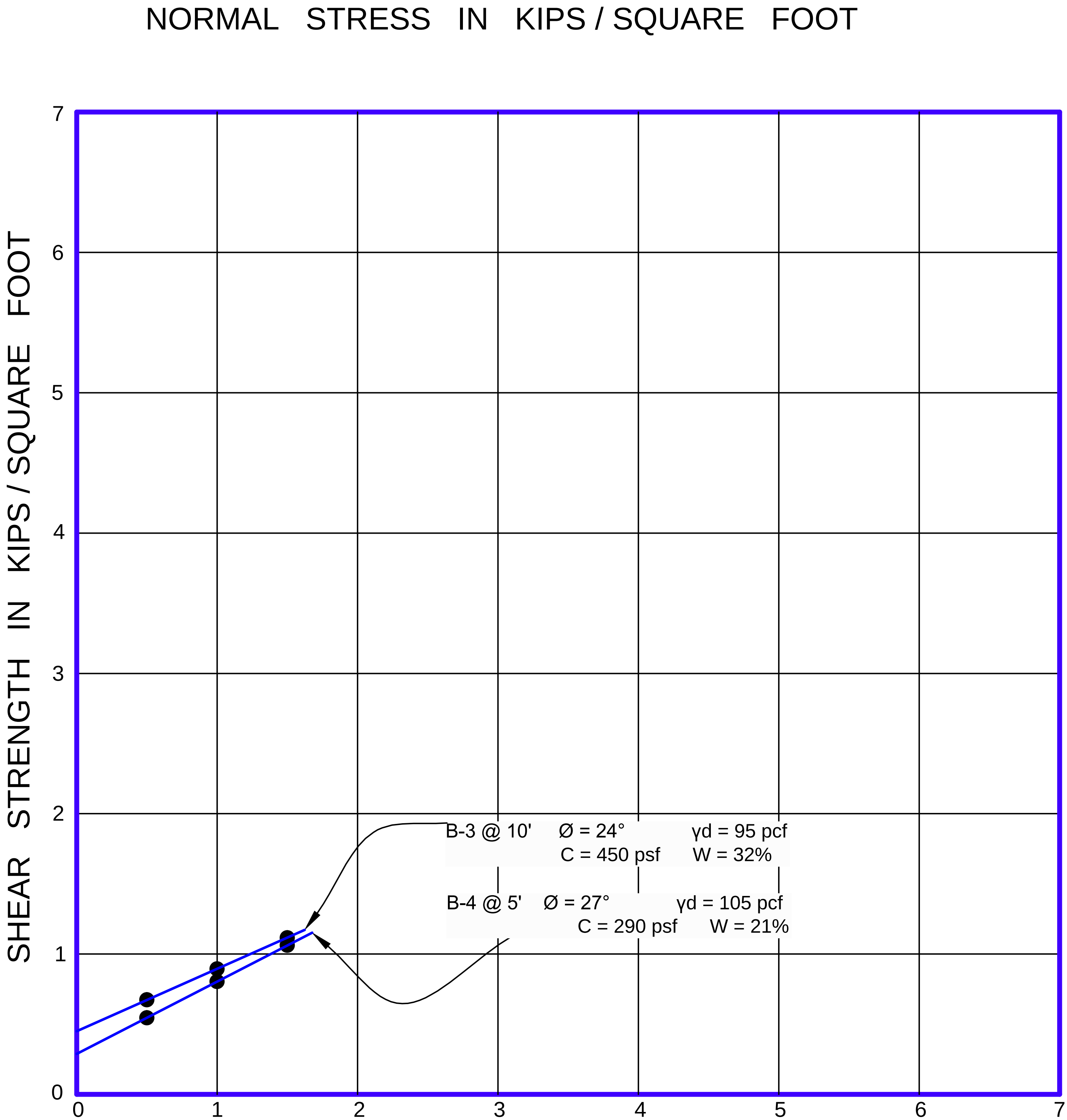
Shear tests were made with a direct shear machine at a constant rate of strain. The machine is designed to test the materials without completely removing the samples from the brass rings. The rate of shear was determined through determination of the rate of consolidation of the foundation bearing materials. For the proposed project, a rate of 0.005 was selected.

A range of normal stresses was applied vertically, and the shear strength was progressively determined at each load in order to determine the internal angle of friction and the cohesion. The tests were performed using ASTM D 3080-04 Laboratory Direct Shear Test Method. The Ultimate shear strength results of direct shear tests are presented on Figure No. II-1 within this Appendix.

Consolidation

The apparatus used for the consolidation tests is designed to receive the undisturbed brass ring of soil as it comes from the field. Loads were applied to the test specimen in several increments, and the resulting deformations were recorded at time intervals. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition or release of water. ASTM D 2435-04 Laboratory Consolidation Test Method.

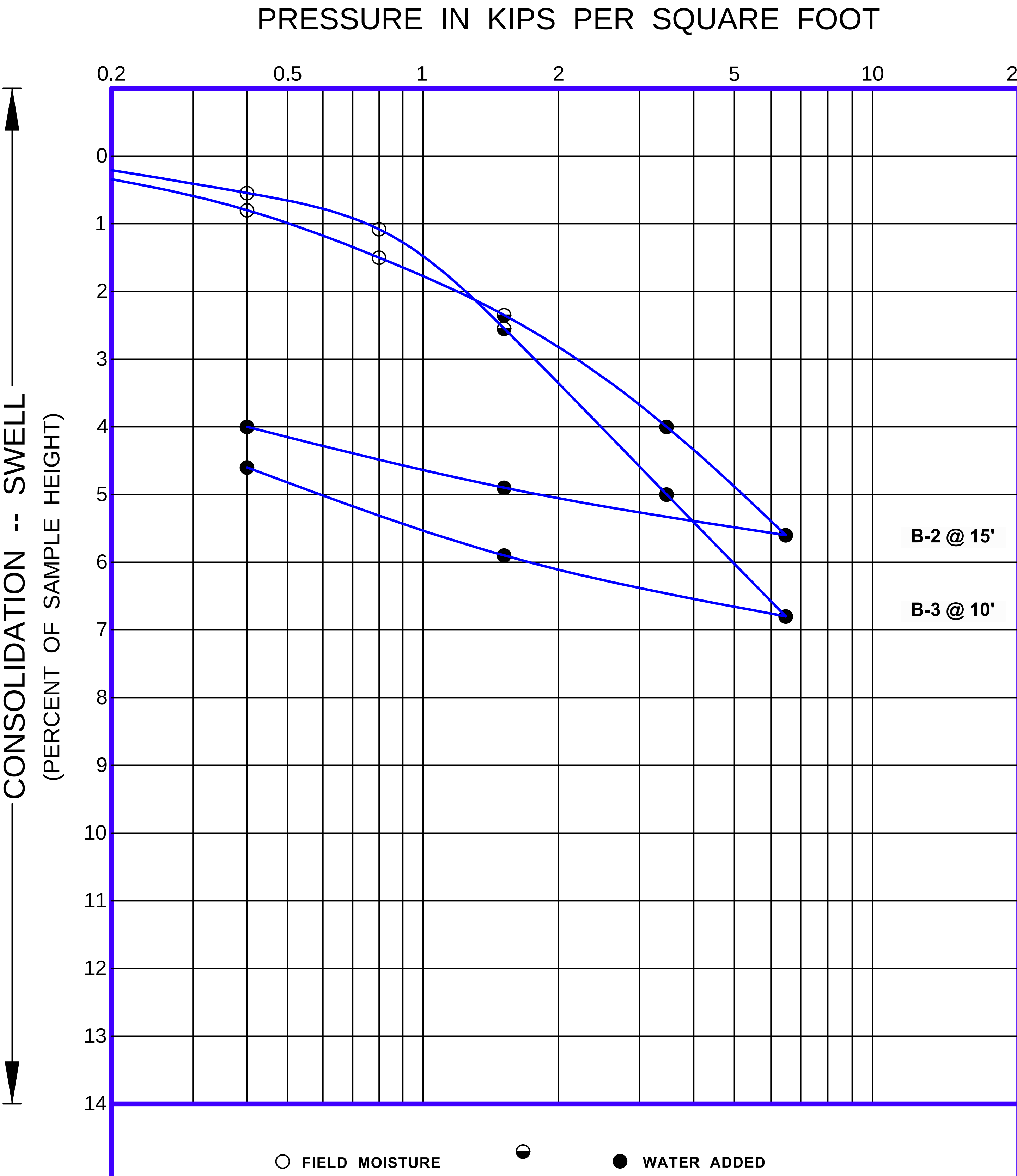
Undisturbed specimens were tested at the field and added water conditions. The test results are shown on Figure No. II-2 within this Appendix.



○ **FIELD MOISTURE** ● **WATER ADDED**

DIRECT SHEAR TESTS

JOB NAME : Propose Multi-Family Residential Building Project 800-840 Fairfax Avenue, Los Angeles, CA 90036	JOB No. 19-402-02
Applied Earth Sciences — GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS — www.aessoil.com (818) 552-6000	FIGURE No. II - 1



SWELL - CONSOLIDATION TESTS

JOB NAME :	Propose Multi-Family Residential Building Project 800-840 Fairfax Avenue, Los Angeles, CA 90036	JOB No. 19-402-02
Applied Earth Sciences	GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS www.aessoil.com (818) 552-6000	FIGURE No. II - 2